

CLAIMS:

1. A method of restoring an IP network in the event of a communication failure between two routers comprising:

providing an IP network comprising:

a plurality of routers;

a plurality of links between the routers for communication of data between each router and any other one of the routers, the links being arranged to provide between each router and each of the other routers at least two alternative paths;

the network being arranged such that each router is provided with a respective primary routing table by which there is provided for that router a respective one of a plurality of preferred paths selected from the alternative paths from that router to each of the other routers;

communicating the data between the routers using for routing the data the primary routing tables;

before a communication failure occurs, pre-calculating for the network a plurality of spanning trees arranged to provide alternative paths in the event that communication between two routers is determined to have failed;

for each of the calculated spanning trees, providing for each the routers a respective one of a plurality of restoration routing

tables and storing in a memory associated with each router the plurality of restoration routing tables for that router in preparation for a communication failure;

detecting a fault indicative of a communication failure;

depending upon the two routers between which the communication is determined to have failed, selecting one of the spanning trees and the restoration routing tables associated with that spanning tree;

communicating to the routers an instruction to transfer routing from the primary routing table to the selected one of the pre-calculated restoration routing tables stored in the memory of the router;

and communicating the data between the routers using the selected, pre-calculated, stored restoration routing tables.

2. The method according to Claim 1 wherein routing is transferred to the restoration tables substantially without delay.

3. The method according to Claim 1 wherein there are two spanning trees and for each router two restoration tables.

4. The method according to Claim 1 wherein there are three spanning trees and for each router three restoration tables.

5. The method according to Claim 1 wherein the spanning trees are pre-calculated to minimize number of spanning trees necessary to restore all paths.

6. The method according to Claim 1 wherein the spanning trees are pre-calculated by the algorithm specified in the specification.

7. The method according to Claim 1 wherein, when a communication failure is detected by a router, that detection of a communication failure causes a communication to all other routers to use the restoration table.

8. The method according to Claim 1 wherein, when a communication failure is detected by a router, that detection of a communication failure causes a communication only to edge routers and wherein the edge routers are arranged to modify the communicated data to communicate the requirement to use the restoration tables to internal routers.

9. The method according to Claim 1 wherein the communicated data is modified by adding a tag.

10. The method according to Claim 1 wherein the communicated data is modified by changing the information contained in the ANEP header.

11. The method according to Claim 1 wherein the restoration tables form a first fault response system and there is provided a secondary fault response system in which, after a pre-determined delay after detection of a fault without the communication

being restored, the primary router tables are recalculated taking into account the absence of the failed communication and the routers arranged to transfer routing back to the re-calculated primary routing tables.

12. The method according to Claim 11 wherein primary routing table is re-calculated to provide optimum paths.

13. The method according to Claim 11 wherein primary routing tables are re-calculated by the routers.

14. The method according to Claim 1 wherein the fault detection is generated in response to a detection in the physical layer so as to be substantially without delay.